

STATEMENT

I, Makoto KONDO, of c/o NGB Corporation, ARK Mori Building 13F, 12-32, Akasaka 1-Chome, Minato-ku, Tokyo 107-6013 Japan, hereby state that I am conversant with both the English and Japanese languages and certify to best of my knowledge and belief that the attached is a true and correct English translation of the priority document of Japanese patent application 2002-205416 filed on July 15, 2002.

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SPECIFICATION

[Title of the Invention]

VEHICLE LAMP

[Claim 1] A vehicle lamp comprising:

first and second lamp chamber portions each including:

5 a light source; a casing having opening and portion for reflecting light emitted from the light source; and lens portion for closing the opening of the casing; the first and second lamp chamber portions each forming lamp chamber partitioned with the casing and the lens portion,

10 wherein the lens portion of the first lamp chamber portion passes light through substantially forward or backward from a vehicle;

at least part of the second lamp chamber portion is disposed within the lamp chamber of the first lamp chamber portion; and
15 the second lamp chamber portion overlaps with the light source of the first lamp chamber portion in the substantially longitudinal direction.

[Claim 2] The vehicle lamp as set forth in claim 1, wherein surface treatment for reflecting the light is applied on an 20 exterior surface of the second lamp chamber portion facing to the light source of the first lamp chamber portion.

[Claim 3] The vehicle lamp as set forth in claim 1, wherein the casing of the second lamp chamber portion is formed of a half-mirror.

25 [Claim 4] The vehicle lamp as set forth in one of claims

1 to 3, wherein the lens portion of the first lamp chamber portion
is formed of a clear lens, and at least part of the lens portion
of the second lamp chamber portion is formed of a diffusion
lens for diffusing light within the lamp chamber of the second
5 lamp chamber portion.

[Claim 5] The vehicle lamp as set forth in one of claims
1 to 4, wherein projected shielding portion for obstructing
direct incidence of the light emitted from the light source
of the first lamp chamber portion on the lens portion of the
10 second lamp chamber portion is formed on the exterior surface
of the second lamp chamber portion.

[Claim 6] The vehicle lamp as set forth in one of claims
1 to 5, wherein slit for guiding the light emitted from the
light source of the first lamp chamber portion to part of the
15 lens portion of the second lamp chamber portion is formed in
the casing of the second lamp chamber portion.

[Claim 7] The vehicle lamp as set forth in one of claims
1 to 6, wherein the second lamp chamber portion is disposed
so as to traverse the inside of the lamp chamber of the first
20 lamp chamber portion.

[Detailed Description of the Invention]

[0001]

[Technical Field to Which the Invention Belongs]

The present invention relates to a vehicle lamp comprising
25 a plurality of lamp chambers respectively having light sources.

[0002]

[Description of the Related Art]

There are known vehicle lamps which are fixed to the front of automotive vehicles and have low- and high-beam functions of emitting light forward from the vehicle, turn-signal functions of informing right and left turns outside and clearance functions of informing vehicle width likewise. The vehicle lamp is a so-called headlight and supplied with a low-beam lamp chamber portion, a high-beam lamp chamber portion, a turn-signal lamp chamber portion and a clearance lamp chamber portion that are independent of one another. Each lamp chamber portion has a light source, a casing for use in reflecting light emitted from the light source, and a lens portion for use in forming a lamp chamber section together with the casing. The casing is formed with an open front portion, a convex rear portion and the opening of the casing is substantially closed with the lens portion. The lamp chamber portions are arranged so that these portions are prevented from optically interfering with each other, that a sufficient luminous area is secured for each of them and that these portions are also prevented from overlapping each other as seen head-on.

[0003]

Moreover, such a vehicle lamp employs electric bulbs as light sources. In case that the bulbs are directly viewable from the outside of a vehicle, it is undesirable in view of

the external appearance of the vehicle. Therefore, a shade as a shielding member for covering each bulb is disposed within the lamp chamber of the vehicle lamp. In other words, the bulbs are unviewable by pedestrians because the bulbs in the vehicle
5 lamp are covered with the shielding members, so that a good external appearance is offered to the vehicle.

[0004]

[Problems to be solved by the Invention]

However, as the lamp chambers are arranged so that the
10 light emitting (longitudinal) directions are prevented from overlapping each other, there develops a problem arising from causing the vehicle lamp as a whole to become large-sized. Consequently, the projection area of the vehicle increases as the projection areas in the light emitting directions also
15 increase, to say nothing of limiting the freedom of shaping the vehicle, which results in making it inconvenient shaping the vehicle from an aerodynamic standpoint. Further, because a portion corresponding to the shielding member in the lens portion does not function sufficiently as a luminous portion,
20 the light emitting efficiency lowers and the problem is that the whole lens portion is not effectively utilizable.

[0005]

An object of the present invention made in view of the situation above is to provide a vehicle lamp designed so that
25 its size is reduced with the luminous area of each lamp chamber

secured and that the whole lens portion is effectively utilizable.

[0006]

[Means for Solving the Problems]

In order to accomplish the object above, a vehicle lamp
5 according to the present invention as described in claim 1,
comprises first and second lamp chamber portions each including:
a light source; a casing having opening and portion for reflecting
light emitted from the light source; and lens portion for closing
the opening of the casing; the first and second lamp chamber
10 portions each forming lamp chamber partitioned with the casing
and the lens portion, wherein the lens portion of the first
lamp chamber portion passes light through substantially forward
or backward from a vehicle; at least part of the second lamp
chamber portion is disposed within the lamp chamber of the first
15 lamp chamber portion; and the second lamp chamber portion overlaps
with the light source of the first lamp chamber portion in the
substantially longitudinal direction.

[0007]

According to the present invention as described in claim
20 1, the space required for both the first and second lamp chamber
portions can be made smaller than the space required for the
first and second lamp chamber portions that are installed
independently of each other instead by disposing part of the
second lamp chamber portion within the first lamp chamber portion.

25

[0008]

When the light source of the first lamp chamber portion is switched on with the light source of the second lamp chamber portion being in the off state, part of the light emitted from the light source of the first lamp chamber portion is obstructed 5 by the second lamp chamber portion and no light is directly incident on the projection part of the second lamp chamber portion in the lens portion of the first lamp chamber portion. As light is reflected by the casing of the first lamp chamber portion into the lamp chamber, the reflected light is incident on the 10 projection part. In other words, light is incident on the whole lens portion of the first lamp chamber portion and the luminous condition of the whole lens portion of the first lamp chamber portion is viewable from the outside of the vehicle.

When the light source of the second lamp chamber portion 15 is switched on with the light source of the first lamp chamber portion being in the off state, light is incident on the lens portion of the second lamp chamber portion, whereby the luminous condition of the lens portion of the second lamp chamber portion is viewable from the outside of the vehicle via the lens portion 20 of the first lamp chamber portion.

When the light source of the first lamp chamber portion and the light source of the second lamp chamber portion are switched on, the whole lens portion of the first lamp chamber portion is made luminous by the light of the light source of 25 the first lamp chamber portion and the lens portion of the second

lamp chamber portion is also made luminous by the light of the light source of the second lamp chamber portion. Thus, the luminous condition of the lens portion of the second lamp chamber portion is viewable from the outside of the vehicle via the
5 lens portion of the first lamp chamber portion.

[0009]

As the second lamp chamber portion is overlapped with the light source of the first lamp chamber portion, the light source of the first lamp chamber portion remains unviewable
10 from the front or rear of the vehicle. In other words, the second lamp chamber portion functions as not only a lamp chamber but also what covers the light source of the first lamp chamber portion.

[0010]

15 It is feasible to reduce the size of the vehicle lamp as a whole by decreasing the space required for the first lamp chamber portion and the second lamp chamber portion with the luminous area of the first lamp chamber portion and that of the clearance lamp chamber portion secured. Consequently, the
20 projection area of the vehicle decreases as the projection areas in the light emitting directions also decrease, to say nothing of improving the freedom of shaping the vehicle, which results in making it convenient to shape the vehicle from an aerodynamic standpoint.

25 The luminous condition of the lens portion of the second

lamp chamber portion is viewable via the lens portion of the turn-signal lamp chamber portion when the light source of the first lamp chamber portion and the light source of the second lamp chamber portion turn luminous. Accordingly, it is possible
5 to give the vehicle an aesthetic shapeability that is non-existent in the conventional vehicle lamp.

[0011]

The light source of the first lamp chamber portion is substantially covered by the second lamp chamber portion whereby
10 to not only make the external appearance of the vehicle lamp favorable but also improve the product value. The covering member of the light source of the first lamp chamber portion can be dispensed with, which results in decreasing the number of parts.

As the portion corresponding to the second lamp chamber portion
15 in the lens portion of the first lamp chamber portion is utilizable as the luminous portion of the second lamp chamber portion, the whole lens portion of the first lamp chamber portion is effectively utilizable.

[0012]

20 According to the present invention as described in claim 2, surface treatment for reflecting the light is applied on an exterior surface of the second lamp chamber portion facing to the light source of the first lamp chamber portion in the vehicle lamp as described in claim 1.

25 [0013]

According to the present invention as described in claim 2 in addition to the function in claim 1, the light emitted from the light source toward the exterior surface of the second lamp chamber portion is reflected in the first lamp chamber portion. In other words, the light emitted from the light source is never absorbed into the exterior surface of the second lamp chamber portion like the second lamp chamber portion whose exterior surface is not subjected to such a surface treatment.

The exterior surface of the second lamp chamber portion 10 is to be reflected in the casing of the first lamp chamber portion with the first lamp chamber portion being in the off state; however, as the exterior surface of the second lamp chamber portion has been subjected to the surface treatment, the casing of the first lamp chamber portion reflected therein. More 15 specifically, the exterior surface of the second lamp chamber portion with the casing of the first lamp chamber portion reflected in the exterior surface thereof is reflected in the casing of the first lamp chamber portion, so that the inside of the casing of the first lamp chamber portion takes on an integral hue because 20 the second lamp chamber portion is not clearly viewable from the outside of the vehicle.

[0014]

Therefore, the light emitting efficiency of the lens portion of the first lamp chamber portion is prevented from being lowered 25 because light in the lamp chamber of the first lamp chamber

portion is absorbed by the second lamp chamber portion, so that
the light emitted from the light source of the first lamp chamber
portion is effectively utilizable. The shadow of the second
lamp chamber portion is not projected on the lens portion of
5 the first lamp chamber portion when the light source of the
first lamp chamber portion is switched on. Consequently, the
lens portion of the first lamp chamber portion can be made luminous
with substantially uniform luminosity and the second lamp chamber
portion is not projected on the casing of the first lamp chamber
10 portion when the light source of the first lamp chamber portion
is switched off. The appearance of the vehicle lamp can thus
be improved while the light source of the first lamp chamber
portion is in the on and off state.

[0015]

15 According to the present invention as described in claim
3, the casing of the second lamp chamber portion is formed of
a half-mirror in the vehicle lamp as described in claim 1.

[0016]

According to the present invention as described in claim
20 3 in addition to the function in claim 1, the half-mirror reflects
light within the second lamp chamber portion and passes through
light incident from the first lamp chamber portion. Thus, the
light emitted from the light source of the first lamp chamber
portion is not impeded by the exterior surface of the casing
25 like the second lamp chamber portion whose casing is not formed

of a half-mirror.

[0017]

Therefore, the light emitting efficiency of the lens portion of the first lamp chamber portion is prevented from being lowered because light in the lamp chamber of the first lamp chamber portion is absorbed by the second lamp chamber portion, so that the light emitted from the light source of the first lamp chamber portion is effectively utilizable. In other words, the lens portion of the first lamp chamber portion can be made luminous with substantially uniform luminosity and the appearance of the vehicle lamp can thus be improved while the light source of the first lamp chamber portion is in the on state.

[0018]

According to the present invention as described in claim 4, the lens portion of the first lamp chamber portion is formed of a clear lens; and at least part of the lens portion of the second lamp chamber portion is formed of a diffusion lens for diffusing light within the lamp chamber of the second lamp chamber portion in the vehicle lamp as described in one of claims 1 to 3.

[0019]

According to the present invention as set forth in claim 4 in addition to the function in one of claims 1 to 3, as the lens portion of the first lamp chamber portion is formed with the clear lens, the luminous condition of the lens portion of

the second lamp chamber portion is clearly viewable from the outside of the vehicle via the lens portion of the first lamp chamber portion. Since at least part of the lens portion of the second lamp chamber portion is formed with the diffusion lens, the irradiation range of the lens portion is relatively wide to ensure that the luminous condition of the lens portion of the second lamp chamber portion is viewable from the outside of the vehicle.

[0020]

When the light source of the second lamp chamber portion is switched on, the second lamp chamber portion becomes viewable clearly and surely from the outside of the vehicle. In other words, even when the light source of the first lamp chamber portion and that of the second lamp chamber portion are switched on with the lens portion of the first lamp chamber portion turned luminous, the luminous condition of the lens portion of the second lamp chamber portion becomes viewable clearly and surely.

[0021]

According to the present invention as described in claim 5, projected shielding portion for obstructing direct incidence of the light emitted from the light source of the first lamp chamber portion on the lens portion of the second lamp chamber portion is formed on the exterior surface of the second lamp chamber portion in the vehicle lamp as described in one of claims 1 to 4.

[0022]

According to the present invention as described in claim 5 in addition to the function in one of claims 1 to 4, of the light emitted from the light source of the first lamp chamber portion, what is emitted toward the lens portion of the second lamp chamber portion is blocked by each of the projected shielding portions from being incident on the lens portion.

[0023]

Therefore, the light of the light source of the first lamp chamber portion is not directly incident on the lens portion of the second lamp chamber portion, whereby the lens portion of the second lamp chamber portion is prevented from turning luminous when the light source of the first lamp chamber portion is switched on. In other words, the lens portion of the second lamp chamber portion is prevented from turning luminous when the light source of the first lamp chamber portion is switched on and the luminous condition of the lens portion of the first lamp chamber portion and that of the lens portion of the second lamp chamber portion are clearly distinguished from each other and also made viewable then.

[0024]

According to the present invention as described in claim 6, slit for guiding the light emitted from the light source of the first lamp chamber portion to part of the lens portion of the second lamp chamber portion is formed in the casing of

the second lamp chamber portion in the vehicle lamp as described in one of claims 1 to 5.

[0025]

According to the present invention as described in claim 5 6 in addition to the function in one of claim 1 to 5, when the light source of the first lamp chamber portion is switched on, the light emitted from the light source is incident on part of the lens portion of the second lamp chamber portion through each of the slits. While the light source of the first lamp 10 chamber portion is in the on state, part of the lens portion of the second lamp chamber portion together with the lens portion of the first lamp chamber portion turns luminous.

Thus, when the light source of the second lamp chamber portion is switched on with the first lamp chamber portion being 15 in the off state, the whole lens portion of the second lamp chamber portion is made luminous by the light of the light source. When the light source of the first lamp chamber portion is switched on with the second lamp chamber portion being in the off state.

The whole lens portion of the first lamp chamber portion and 20 part of the lens portion of the second lamp chamber portion are made luminous by the light of the light source. Further, when the light source of the first lamp chamber portion and the light source of the second lamp chamber portion are simultaneously switched on, the whole lens portion of the first 25 lamp chamber portion and part of the lens portion of the second

lamp chamber portion are made luminous by the light source of the first lamp chamber portion, whereas the other part of the lens portion of the second lamp chamber portion is made luminous by the light source of the second lamp chamber portion.

5 [0026]

When the first lamp chamber portion is switched on with the second lamp chamber portion being in the off state, and contrarily, the whole lens portion of the lamp chamber portion on one side turns luminous, whereby the utilization of the luminous
10 areas of both the lens portions are maximized and the viewability of each lens portion can be improved. When both the lamp chamber portions are in the on state simultaneously, part of the lens portion of the second lamp chamber portion is made luminous by the light source of the first lamp chamber portion.
15 Consequently, the luminous condition of the second lamp chamber portion becomes different from the luminous condition assumed when only the second lamp chamber portion is brought into the on state, which results in attracting viewer's attention, so that the viewability is improved further. As the second lamp
20 chamber portion is allowed to assume different luminous conditions in accordance with the luminous condition of the first lamp chamber portion, the freedom of shaping the vehicle is noticeably improved and so is the product value.

In case that the luminous portion of the lens portion
25 of the first lamp chamber portion is divided into parts by the

luminous portion of the lens portion of the second lamp chamber portion, part of the lens portion of the second lamp chamber portion is disposed so that the divided luminous portions of the lens portion of the first lamp chamber portion are coupled 5 together whereby to make the first lamp chamber portion turn luminous without such a division and this is advantageous in practical use.

[0027]

According to the present invention as described in claim 10 7, the second lamp chamber portion is disposed so as to traverse the inside of the lamp chamber of the first lamp chamber portion in the vehicle lamp as described in one of claims 1 to 6.

[0028]

According to the present invention as described in claim 15 7, in addition to the function in one of claims 1 to 6, the second lamp chamber portion is surely supported at each of its ends outside the lamp chamber of the second lamp chamber portion.

As the second lamp chamber portion is supported with a cantilever structure such that one end of the second lamp chamber portion 20 is disposed within the first lamp chamber portion, for example, the second lamp chamber portion is not left in an unstable condition.

[0029]

Therefore, no load is applied repeatedly to the parts 25 of supporting the second chamber portion even though the second

lamp chamber portion is excessively vibrated during the travel of the vehicle, so that the reliability and durability of the second lamp chamber portion can be improved. Accordingly, the second lamp chamber portion is set free from deformation when used for a long time to ensure that the light source of the first lamp chamber portion is covered up.

[0030]

[Mode for Carrying out the Invention]

Figs. 1 to 4 show an embodiment of the present invention:
10 Fig. 1 is a perspective external view of an automotive vehicle with vehicle lamps fixed to the automotive vehicle; Fig. 2, an elevational view of the vehicle lamp; Fig. 3, a side sectional view of the vehicle lamp; and Fig. 4, a sectional view of the top surface of the vehicle lamp.

15 [0031]

A vehicle lamp 1 is a so-called headlight and as shown in Fig. 1 provided on both sides of the front end of an automobile in bilateral symmetry. The vehicle lamp 1 is fitted with a plurality of lamp chamber portions 2, 3, 4 and 5 with bulbs 2a, 3a, 4a and 5a as light sources disposed on the back sides of the respective lamp chamber portions. The lamp portions 2, 3, 4 and 5 are formed into sections of lens portions 2b, 3b, 4b and 5b and rear-side casings 2c, 3c, 4c and 5c. The lens portions 2b, 3b, 4b and 5b are made of plastics and used for passing incident light substantially forward therethrough. Each

of the casings 2c, 3c, 4c and 5c is furnished with a reflective portion where the incident light is reflected therefrom and made of plastics with aluminum deposited thereon.

[0032]

5 More specifically, the light emitted from the bulbs 2a, 3a, 4a and 5a toward the lens portions 2b, 3b, 4b and 5b proceeds forward from the lamp chamber portions 2, 3, 4 and 5 via the lens portions 2b, 3b, 4b and 5b of the vehicle, whereas the light emitted toward the casings 2c, 3c, 4c and 5c is reflected
10 in the lamp chamber portions 2, 3, 4 and 5 before being caused to move forward from the lamp chamber portions 2, 3, 4 and 5 via the lens portions 2b, 3b, 4b and 5b of the vehicle. Then the lens portions 2b, 3b, 4b and 5b turn luminous when the bulbs 2a, 3a, 4a and 5a of the lamp chamber portions 2, 3, 4 and 5
15 are switched on, so that light is emitted forward from the vehicle.

[0033]

According to this embodiment of the present invention, a high-beam lamp chamber portion 2, a low-beam lamp chamber portion 3, a turn-signal lamp chamber portion 4 and a clearance lamp chamber portion 5 are provided. The roles and functions of the lamp chamber portions 2, 3, 4 and 5 in the automotive vehicle will not be described in detail herein as the roles and functions thereof are similar to those heretofore well known.

As shown in Fig. 3, part of the clearance lamp chamber portion 25 5 is disposed within the turn-signal lamp chamber portion 4

and as shown in Fig. 2 part of the clearance lamp chamber portion 5 is overlapped with the bulb 4a of the turn-signal lamp chamber portion 4 as seen head-on. A description will now be given of an arrangement of the turn-signal lamp chamber portion 4 as 5 a first lamp chamber portion and the clearance lamp chamber portion 5 as a second lamp chamber portion that feature the present invention.

[0034]

When the bulb 4a of the turn-signal lamp chamber portion 10 4 is switched on, the lens portion 4b turns luminous in yellow, whereas when the bulb 5a of the clearance lamp chamber portion 5 is switched on, the lens portion 5b turns luminous in white. According to this embodiment of the present invention, the lens portions 4b and 5b are colorless and the bulbs 4a and 5a turn 15 luminous in yellow and white respectively.

[0035]

As shown in Fig. 2, the clearance lamp chamber portion 5 is disposed so as to laterally pass through the turn-signal lamp chamber portion 4. According to this embodiment of the 20 present invention, the clearance lamp chamber portion 5 is arranged so as to pass through the substantially central part between the top and bottom of the turn-signal lamp chamber portion 4 and also to traverse the inside of the turn-signal lamp chamber portion 4. In other words, according to this embodiment of the 25 present invention, the vehicle lamp 1 can be so structured that

the clearance lamp chamber portion 5 is supported at each of its ends outside the lamp chamber of the turn-signal lamp chamber portion 4 and therefore the clearance lamp chamber portion 5 is surely supported in the vehicle lamp 1.

5 [0036]

The bulb 4a of the turn-signal lamp chamber portion 4 is provided near the central part between the top and bottom of the turn-signal lamp chamber portion 4 and as shown in Fig. 2 the portion 5d of the clearance lamp chamber portion 5 projected 10 into the turn-signal lamp chamber portion 4 is overlapped with the bulb 4a of the turn-signal lamp chamber portion 4. Aluminum is deposited on the exterior surface of the casing 5c of the clearance lamp chamber portion 5 in order to have the incident light reflected therefrom. The bulb 5a of the clearance lamp 15 chamber portion 5 is disposed on the central side between the right- and left-hand sides of and inside the clearance lamp chamber portion 5 and outside the turn-signal lamp chamber portion 4. Incidentally, according to this embodiment of the present invention, the lens portions 4b and 5b of the turn-signal lamp 20 chamber portion 4 and the clearance lamp chamber portion 5 are formed so as to obliquely incline backward toward the lateral outer sides as seen head-on.

[0037]

As shown in Fig. 4, moreover, slits 5e are formed in the 25 projected portion 5d of the clearance lamp chamber portion 5,

so that light within the turn-signal lamp chamber portion 4 is introduced into the clearance lamp chamber portion 5. According to this embodiment of the present invention, a plurality of slits 5e are provided on the lateral outer side of the casing 5c (on the right-hand side in Fig. 4) and each slit 5e is formed with side walls 5f extending in the substantially longitudinal direction. Thus, the light emitted from the bulb 4a is guided by part of the lens portion 5b when the bulb 4a of the turn-signal lamp chamber portion 4 is switched on, whereby part of the lens portion 5b of the clearance lamp chamber portion 5 turns luminous 10 in the color of the bulb 4a (yellow).

In this case, the lens portion 4b of the turn-signal lamp chamber portion 4 is wholly formed with a clear lens. The lens portion 5b of the clearance lamp chamber portion 5 includes 15 clear lens portions corresponding in position to the respective slits 5e and the rest of the clear lens portions are formed with a diffusion lens.

[0038]

As shown in Fig. 3, projected shielding portions 5g are 20 formed on the exterior surface of the casing 5c of the clearance lamp chamber portion 5. The projected shielding portion 5g is provided in the upper and lower portions of the casing 5c. According to this embodiment of the present invention, the upper 25 rear portion of the lens portion 5b and that of the casing 5c and the lower front portion of the lens portion 5b and that

of the casing 5c are made substantially horizontal. Moreover, the upper rear portion of the lens portion 5b and that of the casing 5c are brought into contact with each other with the upper rear portion of the lens portion 5b placed on the upper side, whereas the lower front portion of the lens portion 5b and that of the casing 5c are also brought into contact with each other with the lower front portion of the lens portion 5b placed on the lower side. The projected shielding portion 5g is formed so as to project upward in the rear of the lens portion 5b in the upper rear portion of the casing 5c, whereas the projected shielding portion 5g is formed so as to project downward in the rear of the lens portion 5b in the lower front portion of the casing 5c.

[0039]

In the vehicle lamp 1 thus arranged, the space required for both the lamp chamber portions 4 and 5 can be made smaller than the space required for the lamp chamber portions 4 and 5 that are installed independently of each other instead by disposing part of the clearance lamp chamber portion 5 within the turn-signal lamp chamber portion 4.

[0040]

As the clearance lamp chamber portion 5 is overlapped with the bulb 4a of the turn-signal lamp chamber portion 4, the bulb 4a remains unviewable from the front of the vehicle. In other words, the clearance lamp chamber portion 5 functions

as not only a lamp chamber but also what covers the bulb 4a of the turn-signal lamp chamber portion 4. Each of the slits 5e of the casing 5c of the clearance lamp chamber portion 5 is not overlapped with the bulb 4a of the turn-signal lamp chamber portion 4 as seen head-on, whereupon the bulb 4a is also unviewable via each of the lens portions 4b and 5b from the front of the vehicle. Further, the side walls 5f of each slit 5e extend in the longitudinal direction, whereby the bulb 4a is unviewable obliquely from the front of the vehicle. In other words, the 10 bulb 4a is completely unviewable from the outside of the vehicle through any one of the slits 5e of the casing 5c.

[0041]

When the bulb 4a of the turn-signal lamp chamber portion 4 is switched on with the bulb 5a of the clearance lamp chamber portion 5 being in the off state, part of the light emitted from the bulb 4a of the turn-signal lamp chamber portion 4 is obstructed by the clearance lamp chamber portion 5 and no light is directly incident on the projection part of the clearance lamp chamber portion 5 in the lens portion 4b of the turn-signal lamp chamber portion 4. As light is reflected by the casing 4 of the turn-signal lamp chamber portion 4 into the lamp chamber, the reflected light is incident on the projection part. In other words, light is incident on the whole lens portion 4b of the turn-signal lamp chamber portion 4 and the luminous condition 20 of the whole lens portion 4b of the turn-signal lamp chamber 25

portion 4 is viewable from the outside of the vehicle.

[0042]

When the bulb 5a of the clearance lamp chamber portion 5 is switched on with the bulb 4a of the turn-signal lamp chamber portion 4 being in the off state, light is incident on the lens portion 5b of the clearance lamp chamber portion 5. Therefore the luminous condition of the lens portion 5b of the clearance lamp chamber portion 5 is viewable from the outside of the vehicle via the lens portion 4b of the turn-signal lamp chamber portion 4.

10 4.

[0043]

When the bulb 4a of the turn-signal lamp chamber portion 4 and the bulb 5a of the clearance lamp chamber portion 5 are switched on, the whole lens portion 4b of the turn-signal lamp chamber portion 4 is made luminous by the light of the bulb 4a and the lens portion 5b of the clearance lamp chamber portion 5 is also made luminous by the light of the bulb 5a. Thus, the luminous condition of the lens portion 5b of the clearance lamp chamber portion 5 is viewable from the outside of the vehicle via the lens portion 4b of the turn-signal lamp chamber portion 4.

20 4.

[0044]

When one or both of the lamp chamber portions 4 and 5 are made luminous, the lens portions 4b and 5b turn luminous.

25 When the bulb 4a of the turn-signal lamp chamber portion

4 is switched on according to this embodiment of the present invention, the light emitted from the bulb 4a is incident on part of the lens portion 5b of the clearance lamp chamber portion 5 through each of the slits 5e. While the bulb 4a of the turn-signal lamp chamber portion 4 is in the on state, part of the lens portion 5b of the clearance lamp chamber portion 5 together with the lens portion 4b of the turn-signal lamp chamber portion 5 turns luminous.

[0045]

10 In other words, when the bulb 4a of the turn-signal lamp chamber portion 4 and the bulb 5a of the clearance lamp chamber portion 5 are simultaneously switched on according to this embodiment of the present invention, the whole lens portion 4b of the turn-signal lamp chamber portion 4 and part of the 15 lens portion 5b of the clearance lamp chamber portion 5 are made luminous by the bulb 4a of the turn-signal lamp chamber portion 4, whereas the other part of the lens portion 5b of the clearance lamp chamber portion 5 is made luminous by the bulb 5a of the clearance lamp chamber portion 5. At this time, 20 as the slits 5e are formed in the substantially vertical direction of the casing 5c, the clear lens portions corresponding to the respective slits 5e of the lens portion 5b turn luminous vertically in the color of the turn-signal bulb 4a. In other words, though the lens portion 4b of the turn-signal lamp chamber portion 25 4 is divided by the clearance lamp chamber portion 5 into upper

and low parts as seen head-on, the portions turning luminous in the color of the bulb 4a become viewable consecutively in an integrated condition from the outside of the vehicle as the portions corresponding to the respective slits 5e of the lens portion 5b are made luminous by the bulb 4a.

[0046]

When the bulb 5a of the clearance lamp chamber portion 5 is switched on with the turn-signal lamp chamber portion 4 being in the off state, the whole lens portion 5b of the clearance lamp chamber portion 5 is made luminous in white by the light of the bulb 5a, whereas when the bulb 4a of the turn-signal lamp chamber portion 4 is switched on with the clearance lamp chamber portion 5 being in the off state, the whole lens portion 4b of the turn-signal lamp chamber portion 4 is made luminous in yellow by the light of the bulb 4a as described above.

[0047]

The light emitted from the bulb 4a of the turn-signal lamp chamber portion 4 toward the clearance lamp chamber portion 5 is reflected in the turn-signal lamp chamber portion 4 as the exterior surface of the casing 5c has been subjected to surface treatment. In other words, the light emitted from the bulb 4a is never absorbed into the exterior surface of the clearance lamp chamber portion 5 like the clearance lamp chamber portion 5 whose exterior surface is not subjected to such a surface treatment.

[0048]

Furthermore, the exterior surface of the clearance lamp chamber portion 5 is to be reflected in the casing 4c of the turn-signal lamp chamber portion 4 with the turn-signal lamp chamber portion 4 being in the off state. However, as the exterior surface of the clearance lamp chamber portion 5 has been subjected to the surface treatment, the casing 4c of the turn-signal lamp chamber portion 4 is reflected therein. More specifically, the exterior surface of the clearance lamp chamber portion 5 with the casing 4c of the turn-signal lamp chamber portion 4 reflected on the exterior surface thereof is reflected in the casing 4c of the turn-signal lamp chamber portion 4, so that the inside of the casing 4c of the turn-signal lamp chamber portion 4 takes on an integral hue because the clearance lamp chamber portion 5 is not clearly viewable from the outside of the vehicle.

[0049]

Of the light emitted from the bulb 4a of the turn-signal lamp chamber portion 4, what is emitted toward the lens portion 5b of the clearance lamp chamber portion 5 is blocked by each 20 of the projected shielding portions 5g from being incident on the lens portion 5b.

[0050]

As the lens portion 4b of the turn-signal lamp chamber portion 4 is formed with the clear lens, the luminous condition 25 of the lens portion 5b of the clearance lamp chamber portion

5 is clearly viewable from the outside of the vehicle via the lens portion 5b of the clearance lamp chamber portion 5. Since at least part of the lens portion 4b of the turn-signal lamp chamber portion 4 is formed with the diffusion lens, the 5 irradiation range of the lens portion 5b is relatively wide to ensure that the luminous condition of the lens portion 5b of the clearance lamp chamber portion 5 is viewable from the outside of the vehicle.

[0051]

10 Further, the clearance lamp chamber portion 5 is surely supported at each of its ends outside the lamp chamber of the turn-signal lamp chamber portion 4. As the clearance lamp chamber portion 5 is supported with a cantilever structure such that one end of the clearance lamp chamber portion is disposed within 15 the turn-signal lamp chamber portion 4, the clearance lamp chamber portion 5 is not left in an unstable condition.

[0052]

With the vehicle lamp 1 thus arranged according to this embodiment of the present invention, as part of the clearance 20 lamp chamber portion 5 is disposed within the lamp chamber of the turn-signal lamp chamber portion 4, it is feasible to reduce the size of the vehicle lamp 1 as a whole by decreasing the space required for the lamp chamber portions 4 and 5 with the 25 luminous area of the turn-signal lamp chamber portion 4 and that of the clearance lamp chamber portion 5 secured.

Consequently, the projection area of the vehicle also decreases as the projection areas in the light emitting directions decrease, to say nothing of improving the freedom of shaping the vehicle, which results in making it convenient to shape
5 the vehicle from an aerodynamic standpoint.

[0053]

With the vehicle lamp 1 thus arranged according to this embodiment of the present invention, the luminous condition of the lens portion 5b of the clearance lamp chamber portion 10 5 is viewable via the lens portion 4b of the turn-signal lamp chamber portion 4 when the bulb 4a of the turn-signal lamp chamber portion 4 and the bulb 5a of the clearance lamp chamber portion 5 turn luminous. Accordingly, it is possible to give the vehicle an aesthetic shapeability that is non-existent in the conventional
15 vehicle lamp.

[0054]

With the vehicle lamp 1 thus arranged according to this embodiment of the present invention, as the clearance lamp chamber portion 5 is overlapped with the bulb 4a of the turn-signal lamp chamber portion 4, the bulb 4a of the turn-signal lamp chamber portion 4 is substantially covered by the clearance lamp chamber portion 5 whereby to not only make the external appearance of the vehicle lamp favorable but also improve the product value. The covering member of the bulb 4a of the
20 turn-signal lamp chamber portion 4 can be dispensed with, which
25

results in decreasing the number of parts. As the portion corresponding to the clearance lamp chamber portion 5 in the lens portion 4b of the turn-signal lamp chamber portion 4 is utilizable as the luminous portion of the clearance lamp chamber
5 portion 5, the whole lens portion 4b of the turn-signal lamp chamber portion 4 is effectively utilizable. In this case, as each of the slits 5e is not overlapped with the bulb 4a as seen head-on and formed so as to extend in the longitudinal direction, the bulb 4a is entirely unviewable from the outside of the vehicle
10 through any one of the slits 5e. Consequently, the provision of the slits 5e does not result in lowering the concealment of the bulb 4a.

[0055]

With the vehicle lamp 1 thus arranged according to this
15 embodiment of the present invention, as the exterior surface of the casing 5c of the clearance lamp chamber portion 5 has been subjected to the surface treatment, the light emitting efficiency of the lens portion 4b of the turn-signal lamp chamber portion 4 is prevented from being lowered because light in the
20 lamp chamber of the turn-signal lamp chamber portion 4 is absorbed by the clearance lamp chamber portion 5, so that the light emitted from the bulb 4a of the turn-signal lamp chamber portion 4 is effectively utilizable.

Further, as light is reflected from the exterior surface
25 of the clearance lamp chamber portion 5, the shadow of the clearance

lamp chamber portion 5 is not projected on the lens portion 4b of the turn-signal lamp chamber portion 4 when the bulb 4a of the turn-signal lamp chamber portion 4 is switched on. Consequently, the lens portion 4b of the turn-signal lamp chamber portion 4 can be made luminous with substantially uniform luminosity and the clearance lamp chamber portion is not projected on the casing 4c of the turn-signal lamp chamber portion 4 when the bulb 4a is switched off. The appearance of the vehicle lamp 1 can thus be improved while the bulb 4a of the turn-signal lamp chamber portion 4 is in the on and off state.

[0056]

With the vehicle lamp 1 thus arranged according to this embodiment of the present invention, of the light emitted from the bulb 4a of the turn-signal lamp chamber portion 4, as what is emitted toward the lens portion 5b of the clearance lamp chamber portion 5 is blocked by each of the projected shielding portions 5g from being incident on the lens portion 5b, the light of the bulb 4a of the turn-signal lamp chamber portion 4 is not directly incident on the lens portion 5b of the clearance lamp chamber portion 5, whereby the lens portion 5b of the clearance lamp chamber portion 5 is prevented from turning luminous when the bulb 4a of the turn-signal lamp chamber portion 4 is switched on. In other words, the lens portion 5b of the clearance lamp chamber portion 5 is prevented from turning luminous when the bulb 4a of the turn-signal lamp chamber portion 4 is switched

on and the luminous condition of the lens portion 4b of the turn-signal lamp chamber portion 4 and that of the lens portion 5b of the clearance lamp chamber portion 5 are clearly distinguished from each other and also made viewable then.

5 [0057]

With the vehicle lamp 1 thus arranged according to this embodiment of the present invention, when the turn-signal lamp chamber portion 4 is switched on with the clearance lamp chamber portion 5 being in the off state, and contrarily, the whole 10 lens portion 4b or 5b of the lamp chamber portion 4 or 5 turns luminous, whereby the utilization of the luminous areas of the lens portions 4b and 5b are maximized and the viewability of each lens portion 4b or 5b can be improved.

[0058]

15 With the vehicle lamp 1 thus arranged according to this embodiment of the present invention, the slits 5e are provided in the clearance lamp chamber portion 5 and when the lamp chamber portions 4 and 5 are in the on state simultaneously, part of the lens portion 5b of the clearance lamp chamber portion is 20 made luminous by the bulb 4a of the turn-signal lamp chamber portion 4. Consequently, the luminous condition of the clearance lamp chamber portion 5 becomes different from the luminous condition assumed when only the clearance lamp chamber portion 5 is brought into the on state, which results in attracting 25 viewer's attention, so that the viewability is improved further.

As the clearance lamp chamber portion 5 is allowed to assume different luminous conditions in accordance with the luminous condition of the turn-signal lamp chamber portion 4, the freedom of shaping the vehicle is noticeably improved and 5 so is the product value.

[0059]

With the vehicle lamp 1 thus arranged according to this embodiment of the present invention, though the luminous portion of the lens portion 4b of the turn-signal lamp chamber portion 10 4 is divided by the luminous portion of the lens portion 5b of the clearance lamp chamber portion 5 into parts, the turn-signal luminous portion in yellow is not divided by the clearance luminous portion in white into parts by turning luminous part of the lens portion 5b of the clearance lamp chamber portion 5 so as 15 to couple the divided luminous portion of the lens portion 4b of the turn-signal lamp chamber portion 4 when the turn-signal bulb 4a is switched on and this is very advantageous in practical use.

[0060]

With the vehicle lamp 1 thus arranged according to this embodiment of the present invention, as the bulb 5a of the clearance lamp chamber portion 5 is not overlapped with the turn-signal lamp chamber portion 4, the wiring of the bulb 5a and the like are drawn around the outside of the turn-signal lamp chamber 25 portion 4. Therefore, the wiring of the bulb 5a and the like

are prevented from shielding or absorbing light within the lamp chamber of the turn-signal lamp chamber portion 4. Thus, the function of the turn-signal lamp chamber portion 4 is not impeded.

[0061]

5 With the vehicle lamp 1 thus arranged according to this embodiment of the present invention, as the clearance lamp chamber portion 5 is supported at each of its ends, no load is applied repeatedly to the parts of supporting the clearance lamp chamber portion 5 even though the clearance lamp chamber portion 5 is
10 excessively vibrated during the travel of the vehicle, so that the reliability and durability of the clearance lamp chamber portion 5 can be improved. Accordingly, the clearance lamp chamber portion 5 is set free from deformation when used for a long time to ensure that the bulb 4a of the turn-signal lamp
15 chamber portion 4 is covered up.

[0062]

Incidentally, the vehicle lamp 1 has been shown as what is applicable to headlights provided at the front end of a vehicle in the aforesaid embodiment of the present invention; however,
20 the vehicle lamp may needless to say be applicable to tail lamps provided at the rear end of a vehicle, for example.

[0063]

The clearance lamp chamber portion 5 has been shown as what is arranged within the lamp chamber of the turn-signal lamp chamber portion 4 in the aforesaid embodiment of the present

invention; however, the turn-signal lamp chamber portion may be arranged within the lamp chamber of the clearance lamp chamber portion, for example. In other words, operation/working-effect similar to what is mentioned in the aforesaid embodiment of
5 the present invention is obtainable as long as at least part of one lamp chamber portion is arranged within the lamp chamber of another lamp chamber portion whatever function each of the lamp chamber portions has.

[0064]

10 The bulbs 4a and 5a have been shown as light sources for use in the aforementioned embodiment of the present invention; however, any light source may be used as long as the light source operates to emit light such as LED.

[0065]

15 The casings 4c and 5c have been shown as those with aluminum deposited on their surfaces in the aforesaid embodiment of the present invention; however, casings may be coated with silver paint for light-reflecting purposes.

[0066]

20 The casing 5c of the clearance lamp chamber portion 5 has been shown as what has the exterior surface subjected to surface treatment for reflecting light in the aforesaid embodiment of the present invention; however, the casing 5c may be formed of a half-mirror. In this case, the half-mirror reflects light
25 within the clearance lamp chamber portion 5 and passes through

light incident from the turn-signal lamp chamber portion 4. Thus, the light emitted from the bulb 4a of the turn-signal lamp chamber portion 4 is not impeded by the exterior surface of the casing 5c like the clearance lamp chamber portion 5 whose 5 casing 5c is not formed of a half-mirror.

Therefore, the light emitted from the bulb 4a of the clearance lamp chamber portion 4 is effectively utilizable without lowering the light emitting efficiency of the lens portion 5b of the clearance lamp chamber portion 5 because proceeding of 10 light within the lamp chamber of the turn-signal lamp chamber portion 4 is impeded by the clearance lamp chamber portion 5.

In other words, the lens portion 4b of the turn-signal lamp chamber portion 4 can be made luminous with substantially uniform luminosity and the appearance of the vehicle lamp can be improved 15 while the bulb 4a is in the on state.

[0067]

The lens portion 4b of the turn-signal lamp chamber portion 4 has been shown as what is divided by the lens portion 5b of the clearance lamp chamber portion 5 into upper and low parts 20 as seen head-on; however, the lens portion 4b may needless to say be divided in any other direction or may not be divided.

In addition, the specific detailed structure and the like may also be changed properly.

[0068]

25 [Effect of the Invention]

As set forth above in detail, the automotive vehicle lamp according to the present invention is designed so that the space required for the first lamp chamber portion and the second lamp chamber portion is reduced whereby to decrease the size of the 5 whole vehicle lamp with the luminous area of each of the first and second lamp chamber portions secured. Consequently, the projection area of the vehicle decreases as the projection areas in the light emitting directions also decrease, to say nothing of improving the freedom of shaping the vehicle, which results 10 in making it convenient to shape the vehicle from an aerodynamic standpoint.

Further, the luminous condition of the lens portion of the second lamp chamber portion is viewable via the lens portion of the first lamp chamber portion when the light source of the 15 first lamp chamber portion and that of the second lamp chamber portion turn luminous. Accordingly, it is possible to give the vehicle an aesthetic shapeability that is non-existent in the conventional vehicle lamp.

The light source of the first lamp chamber portion is 20 substantially covered by the second lamp chamber portion whereby to not only make the external appearance of the vehicle lamp favorable but also improve the product value. The covering member of the light source of the first lamp chamber portion can be dispensed with, which results in decreasing the number of parts. 25 As the portion corresponding to the second lamp chamber portion

in the lens portion of the first lamp chamber portion is utilizable as the luminous portion of the second lamp chamber portion, the whole lens portion of the first lamp chamber portion is effectively utilizable.

5 [Brief Description of the Drawings]

[Figure 1]

A diagram showing an embodiment of the present invention; a perspective external view of an automotive vehicle with vehicle lamps fixed to the automotive vehicle.

10 [Figure 2]

An elevational view of the vehicle lamp.

[Figure 3]

A side sectional view of the vehicle lamp.

[Figure 4]

15 A sectional view of the top surface of the vehicle lamp.

[Description of Reference Numerals and Signs]

1 vehicle lamp

2 high-beam lamp chamber portion

2a bulb

20 2b lens portion

2c casing

3 low-beam lamp chamber portion

3a bulb

3b lens portion

25 3c casing

4 turn-signal lamp chamber portion
4a bulb
4b lens portion
4c casing
5 5 clearance lamp chamber portion
5a bulb
5b lens portion
5c casing
5d projected portion
10 5e slit
5g projected shielding portion

[Designation of Document]

ABSTRACT

[Abstract]

[Problem] To provide a vehicle lamp designed so that its size is reduced with the luminous area of each lamp chamber secured
5 and that the whole lens portion is effectively utilizable.

[Means for Solving the Problem] At least part of a clearance lamp chamber portion 5 is disposed in the lamp chamber of a turn-signal lamp chamber portion 4 so that that part of the clearance lamp chamber portion 5 is overlapped with the bulb
10 4a of the turn-signal lamp chamber portion 4 in the longitudinal direction. When the bulbs 4a and 5a of the respective lamp chamber portions 4 and 5 are switched on, the whole lens portion 4b of the turn-signal lamp chamber portion 4 is caused to turn luminous by the light of the bulb 4a of the turn-signal lamp
15 chamber portion 4, whereas the lens portion 5b of the clearance lamp chamber portion 5 is caused to turn luminous by the light of the bulb 5a of the clearance lamp chamber portion 5. The luminous condition of the lens portion 5b of the clearance lamp chamber portion 5 is viewable via the lens portion 4b of the turn-signal lamp chamber portion 4 from the outside of the vehicle.
20

[Selected Drawing] Fig. 4



1/4

FIG. 1

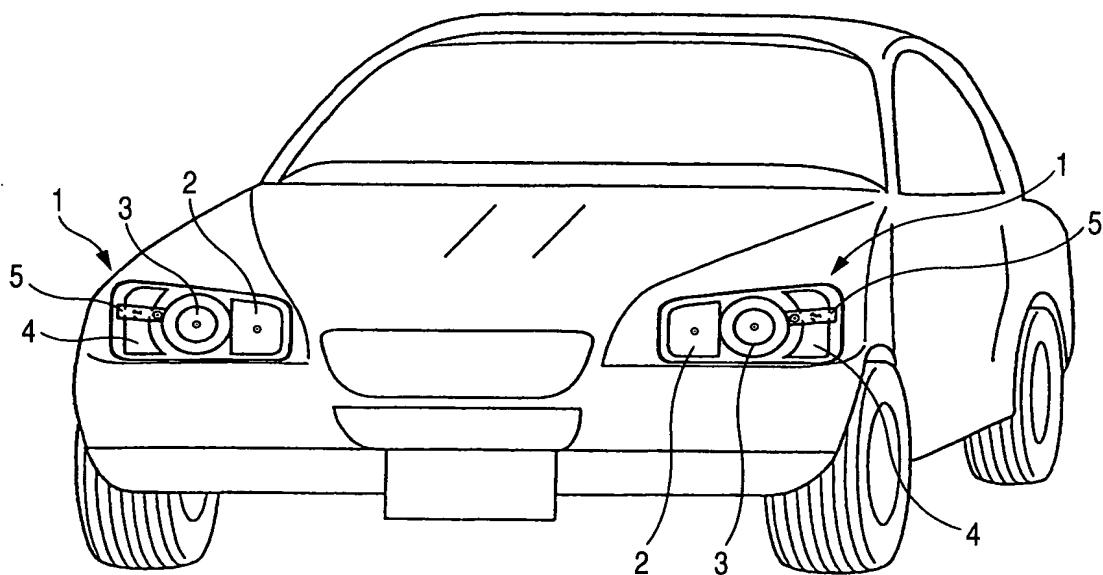


FIG. 2

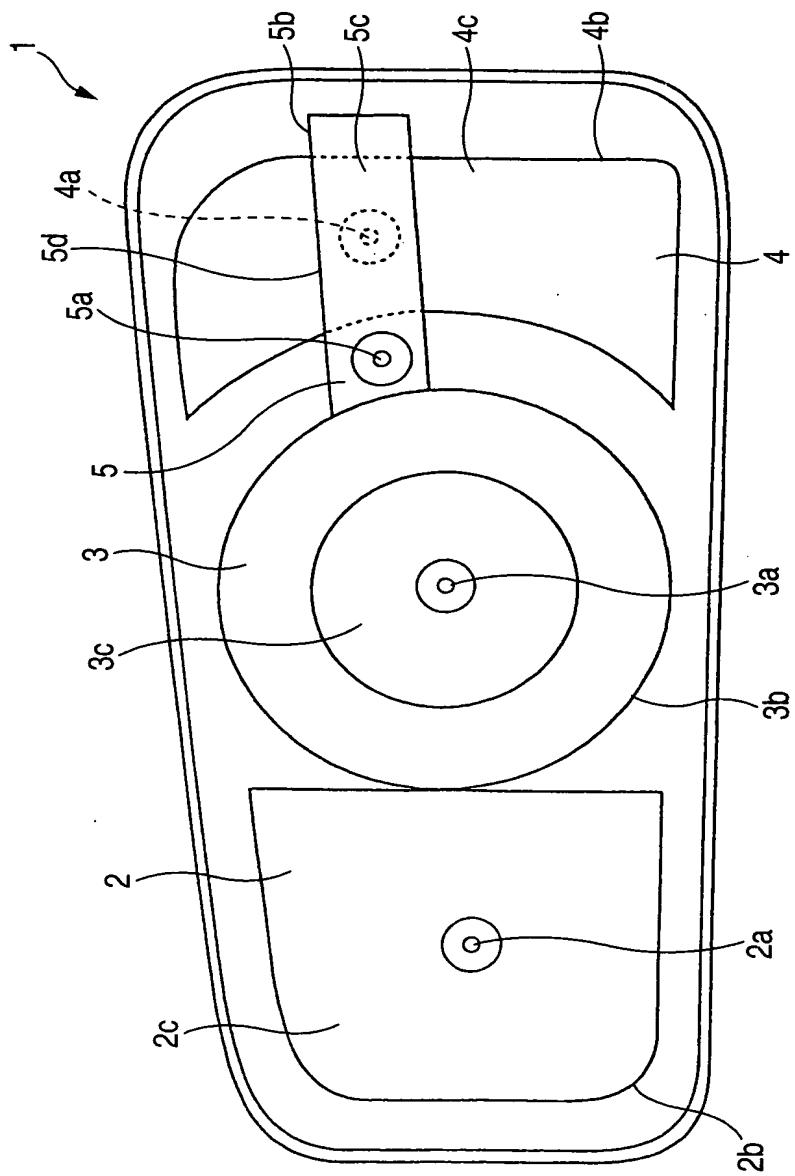


FIG. 3

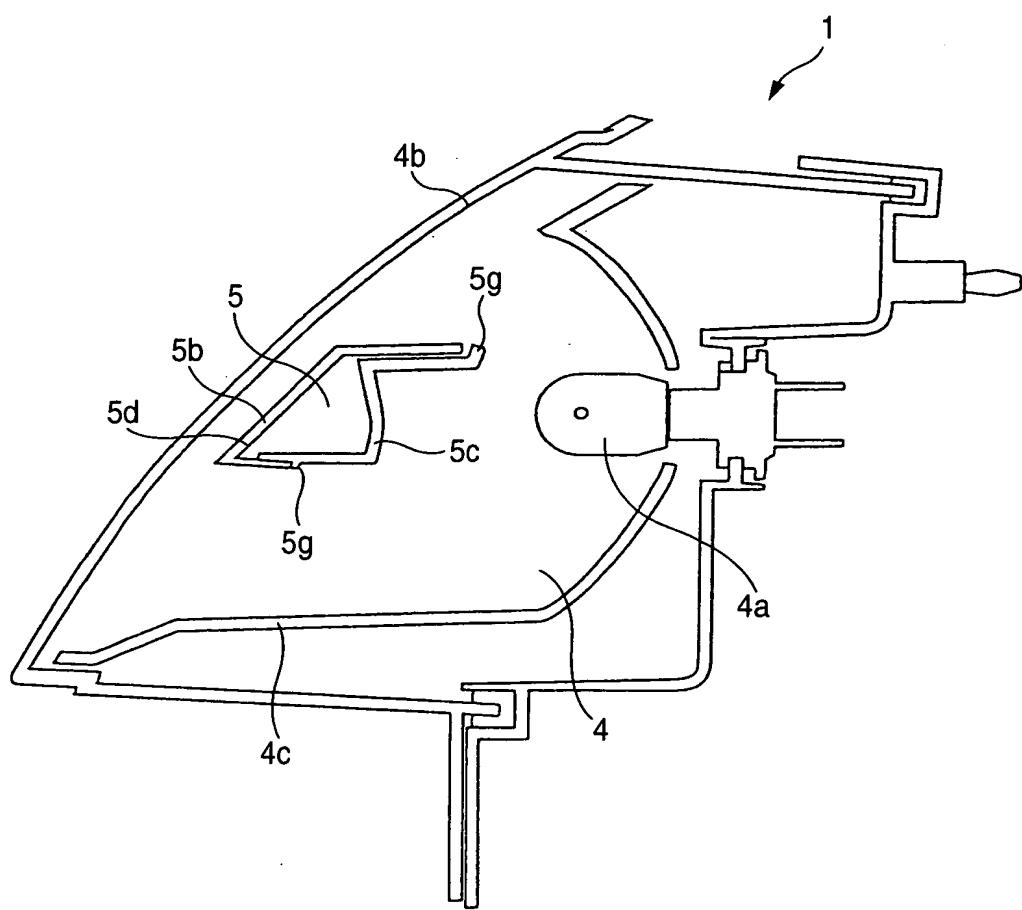


FIG. 4

